REMARKS

Claims 1, 2 and 5-7 are pending in this application, with claims 6 and 7 currently withdrawn from consideration. Claim 3 has been canceled herein without prejudice or disclaimer. Claim 1 has been amended herein.

Claim 1 is amended so as to recite that the crosslinking agent (B) is a polyisocyanate crosslinking agent. This limitation was recited in claim 3, claim 3 being canceled in this amendment.

In addition, claim 1 is amended to define the polyurethane resin as one of polyurethane resins obtained by various manufacturing methods described in paragraphs [0040] to [0044] on pages 16 to 18 of the specification. Applicants therefore submit that no new matter is added by this amendment.

Claims 1-3 and 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Voss and Rolando in view of Itabashi and Emmons. (Office action paragraphs no. 2-7)

The rejection is overcome by the amendment to claim 1. Support for the amendment to claim 1 is discussed above.

As amended, claim 1 differs from the cited references as follows:

Differences from Rolando et al.

1) Applicants submit that the crosslinking agent (B), recited in claim 1 to be a polyisocyanate crosslinking agent, differs from that used by Rolando. Rolando discloses a polyurethane adhesive composition, which contains a curing agent such as an epoxy-type crosslinking agent (column 8, lines 51-52; and Example 5).

2) Secondly, claim 1 is amended to recite that the water-borne polyurethane resin (A) is obtained by one of five recited processes. Rolando does not disclose such a process.

Rolando discloses in Examples that the triethylamine as the neutralizer is added with TMXDI (tetramethylxylene diisocyanate) at the early reaction stage of the polyurethane formation (see, for example, Example 1 in column 10, line 22, and Example 2 in column 10, line 63). That is, the neutralizer for giving water dispersibility is used at the time of polyurethane formation. Applicants note that in the manufacturing process of water borne polyurethane resins, a neutralizer is normally used for giving dispersibility in water.

In contrast, the present invention discloses that the neutralizer may be added at any time of the forming process of the polyurethane adhesive (see paragraph [0033], on page 14, last two lines). As a matter of fact, as described in the manufacturing methods (paragraphs [0040] to [0044]), the neutralizer is not added at the early reaction stage of the polyurethane formation mixed with raw materials, but it is added, in the present invention, to the prepolymer after formation of the prepolymer.

3) The object of the polyurethane adhesive by Rolando is to laminate polyolefin or polyester films, which means that the viscosity of the adhesive should be low, less than 1000 cps, and the viscosity of the Rolando adhesive range from 100 to 500 cps (column 9, lines 3-4). In contrast, since the polyurethane adhesive of the present invention is for dry-lamination of the artificial leather, so that the viscosity of the adhesive of the present invention is as high as 10,000 cps.

4) Claim 1 recites specific limitations on softening temperature. Rolando et al. does not describe the softening temperature of the polyurethane resin. The drying temperature in Rolando

differs from the softening temperature and the softening temperature cannot be estimated from the drying temperature of the polyurethane resin adhesive.

"Dry laminate of the artificial leather" is defined by a method comprising the steps of coating the adhesive on the surface of the leather sheets, drying the adhesive coating leather sheets for removing the solvent (water) in the adhesive coats, formation of the dry laminate by laminating and heating the adhesive under pressure. Therefore, the drying process and the laminating and heating process are different processes. The drying temperature described in Rolando is a temperature in the drying process for removing the solvent or water in the adhesive coat, and the softening temperature described in the present invention is a temperature in the heating process of the laminated leather sheets for converting the laminated sheets into a dry laminate sheet by softening the adhesive and fixing the laminate into one artificial leather. The softening temperature is a very important parameter in the dry laminate process, because the artificial leather is formed by adhering the leather sheets by softening the adhesive. Therefore, the drying temperature differs from the softening temperature.

In general, in the dry laminate process, the adhesive having a softening temperature of 90°C is dried at 60°C, and at the laminating and heating process, the coated sheets are pressure laminated and heated by pressure roll process at 100°C. This temperature of 60°C is within a temperature range of 50 to 85°C, stated by Rolando, and the laminating and heating process is carried out at a temperature higher than the temperature range of the Rolando drying temperature. This is one example, and even if the drying temperature is within the Rolando drying temperature range, the dry laminate can be formed at a higher temperature than the above drying temperature range.

Applicants therefore analyze the drying temperature range in Rolando as follows. The drying temperature range from 50 to 85°C described by Rolando is appropriate for removing water in the Rolando adhesive while maintaining the surface quality of the adhesive coat layer. If the temperature is less than 50°C, the drying efficiency is low, and if the temperature exceeds 85°C, the surface becomes rough by rapid water evaporation. However, the drying temperature is not equivalent to the softening temperature for softening and melting the adhesive.

Applicants therefore submit that the drying temperature range of 50 to 85°C in Rolando et al. does not suggest that the polyurethane adhesive should have a softening temperature below 50°C, as required by claim 1.

In the present invention, when the adhesive coat is heated to a range of 50 to 85°C, the adhesive coat is converted into a dry film and, at the same time, the dry film becomes viscous because the temperature exceeds the softening temperature of the present adhesive resin composition. Rolando does not describe how the adhesive coat changes when the coat is heated at the drying temperature range and whether it becomes viscous. Applicants do not believe that Rolando discloses a drying temperature range of 50 to 85°C for forming a viscous adhesive layer.

Difference of the present invention from Voss et al.

1) Claim 1 requires that the water-borne polyurethane resin (A) be made by one of five specific processes. Voss et al. does not disclose these manufacturing processes of the water borne polyurethane resin (A).

2) Claim 1 requires thickener (C), which is a surface active agent in the system of an

association-type polymer. Since the adhesive by Voss et al. is used for laminating films, the adhesive does not include thickener in the adhesive composition, in contrast to the present invention. Moreover, Voss et al. does not disclose an association-type thickener.

3) Claim 5 requires aqueous dispersible colorants. Voss does not disclose that the adhesive includes aqueous dispersible colorants.

4) The adhesive disclosed by Voss et al. has a low viscosity (column 5, lines 6-8) ranging from 50 to 100 cps. The low viscosity is because it is required to use for lamination of films provided with flat surfaces with a thin adhesive layer.

In contrast, since the adhesive of the present invention is to laminate thick artificial leather having comparatively rough surface roughness, the viscosity of the present polyurethane resin may be as high as 10,000 cps.

5) Claim 1 recites specific limitation on softening temperature. Voss et al. does not disclose the softening temperature of the polyurethane resin.

Applicants therefore submit that the combination of Rolando et al. and Voss et al. does not provide the limitations of claim 1 on the method of making of the polyurethane resin (A), on the crosslinking agent (B), on the thickener (C), and on the softening temperature. Applicants note that Emmons et al. was cited only for the teaching of associative thickeners and Itabashi et al. for the disclosure of polyurethane pigment dispersing agents. Applicants therefore argue that the combination of references does not provide the limitations of claim 1, and that claims 1, 2 and 5 are novel and non-obvious over Voss et al., Rolando et al, Itabashi et al. and Emmons et al., taken separately or in combination. Reconsideration of the rejection is respectfully requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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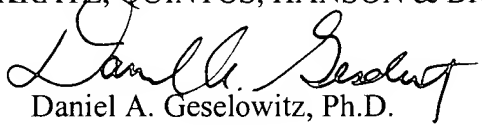

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